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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,745	07/08/2005	Hiroshi Yamamoto	28955.4028	9824
27890	7590	03/17/2009		
STEP TOE & JOHNSON LLP 1330 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036			EXAMINER WILSON, MICHAEL H	
			ART UNIT	PAPER NUMBER
			1794	
			MAIL DATE	DELIVERY MODE
			03/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/541,745

**Applicant(s)**

YAMAMOTO ET AL.

**Examiner**

MICHAEL WILSON

**Art Unit**

1794

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3, 6, 7, 9-11 and 13-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 9-11 and 13-21 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action is in response to Applicant's amendment filed 19 December 2008, which cancels claims 4, 5, 8, and 12 and amends claims 1 and 9-11.

Claims 1-3, 6, 7, 9-11, and 13-21 are pending.

2. The provisional double patenting rejections on the ground of nonstatutory obviousness-type double patenting as being unpatentable in the action mailed 21 August, 2008 are withdrawn due to applicants amending of the claims in the reply filed 19, December, 2008.

### ***Claim Objections***

3. Claims 3 and 21 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Regarding claim 3, the general recitation of Ar<sup>1</sup> in the claim is broader than Ar<sup>1</sup> in parent claim.

Regarding claim 21, the claim recites a list of groups which may be substituents of Ar<sup>2</sup>. However, substituents fro Ar<sup>2</sup> are limited by the parent claim to a single group,

alkyl. Further the alkyl group of the parent claim is narrower in scope (1 to 6 carbons) than recited in claim 21 (1 to 20 carbons).

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

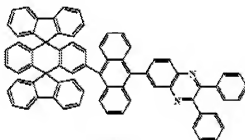
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 3, 14-18, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. (US 6,998,487 B2).

Regarding claims 1 and 3, Kim et al. disclose a heterocyclic compound with a double-spiro group for use in organic electroluminescent devices (column 9, lines 20-50). The reference discloses the compound shown below (column 21, compound 203).



Chemical Compound 203

Compound 203 meets the requirements general formula (1) wherein HAR is quinazoline, specifically 2,3-diphenylquinazoline, L is a single bond, and Ar<sup>1</sup> is anthracene, and Ar<sup>2</sup> is a dispiro aryl group having 6 to 60 carbon atoms.

Regarding claims 14-18, Kim et al. discloses all the claim limitations as set forth above. Additionally the reference discloses an organic electroluminescent devices having a light emitting layer between an anode and cathode (pair of electrodes) (Column 37, lines 50-62). The materials described above are used in the light emitting layer (column 42, lines 9-11), or as electron transporting material in the electron transporting (column 40, lines 58-60) or injection layer (column 41, lines 33-34).

Regarding claim 21, Kim et al. disclose all the claim limitations as set forth above. Additionally while claim 21 recites substituent groups for Ar<sup>2</sup> the claim does not require Ar<sup>2</sup> to have a substituent. Therefore the claim is anticipated as described above.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 6,998,487 B2) as applied to claim 1 above.

Regarding claims 2 and 6, Kim et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein a divalent aryl group is between the anthracene and the heteroaromatic group in the compounds of Kim et al. (column 17-19 and 21-24, compounds 126, 129-132, 204, 206, 208-211, 213, and 217). However the reference does not explicitly disclose a compound of instant formula (1) with an L of phenyl.

However, given the numerous examples of a phenyl spacer between anthracene and a heteroaromatic group it would be obvious to one of ordinary skill in the art at the time of the invention to try placing a phenyl spacer between quinazoline and anthracene in compound 203 with the reasonable expectation of producing a compound with similar properties suitable for the same purpose (KSR v. Teleflex, 127 S.Ct. 1727, 1740, 82 USPQ2d 1385, 1396 (2007)).

9. Claims 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 6,998,487 B2) as applied to claim 18 above, and in view of Kido et al. (US 6,013,384).

Regarding claims 19 and 20, Kim et al. disclose all the claim limitations as set forth above. Additionally the reference discloses the compound for use in organic electroluminescent devices, including the use of the material in an electron injection layer of the device (column 41, lines 33-34). However the reference does not explicitly disclose the use of a reducing dopant in the electron injection layer.

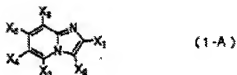
Kido et al. teach an organic electroluminescent device where the electron transport layer adjacent to the cathode is doped with a metal capable of acting as an electron donor (reductive dopant). The reference teaches that doping the layer results in a lowered driving voltage, regardless of the work function of the cathode material. (abstract). The reference further teaches that the dopant includes alkali metals, and alkali earth metals. (column 4, lines 8-11 )

Given the teaching of the benefit of doping the electron transport layer with a reductive dopant, as taught by Kido et al. it would have been obvious to one of ordinary skill in the art at the time of the invention to dope the electron transport layer (comprising the heterocyclic compound) adjacent to the cathode with a reductive dopant. One of ordinary skill would be motivated by a desire to decrease the driving voltage.

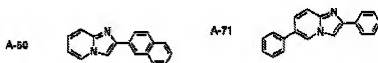
10. Claims 9-11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakatsuka et al. (JP 2001/035664 A), machine translation relied upon.

Regarding claims 9-11 and 13, Nakatsuka et al. disclose heterocyclic compounds containing the imidazopyridine structure shown below [0007]. The reference uses the

compounds in an organic electroluminescent device. Nakatsuka et al. define the substituents on the molecule where X4 includes substituted or unsubstituted aryl substituents [0007]. The reference explicitly mentions 1- and 2-naphthyl substituents [0014], and aryl substituents of 6-10 carbons are preferred, but are not limited [0020].



Nakatsuka et al. give several examples, including naphthyl substituents (shown below, compound A-50, [0032]), though the reference does not illustrate specifically a naphthyl substituent at X4, but do give examples of aryl substitution at position X4, as shown below (compound A-71, [0037]).



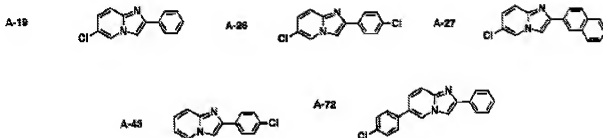
Nakatsuka et al. give further examples of compounds with more than one aryl ring, such as the compounds shown below. (Compound A-32, [0029])



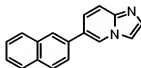
Nakatsuka et al. describe compounds which could easily be functionalized with other substituents by simple Suzuki type coupling reactions, such as the compounds shown below (A-19, [0026]; A-26 and A-27, [0028]; A-43, [0031]; and A-72, [0037]).

These compounds can easily be further functionalized at either end of the molecule.

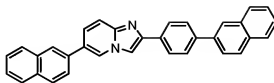




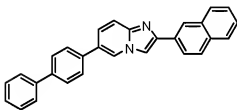
The compound A-50 is a position isomer of the structure shown below (which is within the scope of the claims), and as such, would be predicted to function in the manner, and therefore be obvious to one of ordinary skill. As stated in the MPEP 2144.09 (11) compounds which are position isomers (compounds having the same radicals in physically different positions on the same nucleus) or homologs (compounds differing regularly by the successive addition of the same chemical group, e.g., by -CH<sub>2</sub>- groups) are generally of sufficiently close structural similarity that there is a presumed expectation that such compounds possess similar properties. In re Wilder, 563 F.2d 457, 195 USPQ 426 (CCPA 1977).



Given the level of detail in the disclosure, it would have been obvious to one of ordinary skill in the art to make imidazopyrimidine compounds such as the ones shown below (among others), since they would be predicted to function in the same manner. The compounds shown below could be easily prepared by one of ordinary skill in the art from compounds such as A-19, A-25, or A-27 shown above by a single reaction.



This compound (shown immediately above) meets the limitations wherein  $\text{Ar}^1$  is naphthyl (10 carbons), and  $\text{Ar}^2$  is naphthyl (10 carbons), and  $\text{L}^1$  is a single bond, and  $\text{L}^2$  is phenylene.



This compound (shown immediately above) meets the limitations wherein  $\text{Ar}^1$  is phenyl (6 carbon aromatic),  $\text{Ar}^2$  is naphthyl (10 carbon aromatic),  $\text{L}^1$  is phenylene, and  $\text{L}^2$  is a single bond.

### ***Response to Arguments***

11. Applicant's arguments filed 19 December, 2008 have been fully considered but they are not persuasive.

Regarding Kim et al. (US 6,998,487 B2) applicants argue that the reference not disclose applicant's  $\text{Ar}^2$  group. Kim et al.'s compound 203, applicants assert, does not disclose an aryl group at the  $\text{Ar}^2$  position, which may only be substituted with an alkyl group. However as explained above the  $\text{Ar}^2$  group of Kim et al.'s compound 203 can be considered the entire dispiro-aryl group, much like fluorene and spirobifluorene are

commonly considered a single aryl group. In this view Ar<sup>2</sup> of Kim et al.'s compound 203 is unsubstituted, meeting the present claims.

Regarding Nakatsuka et al. (JP 2001/035664 A) applicants argue that compound A-50 is not a position isomer of applicants' claimed compounds, and that there is no teaching or suggestion in Nakatsuka to further functionalize the compounds of Nakatsuka or to use the Suzuki coupling reaction. While the examiner agrees that compound A-50 of Nakatsuka et al. is not a positional isomer of the claimed compounds it is a positional isomer of 6-(2-naphthyl)imidazo[1,2-a]pyridine which demonstrated the obviousness of placing a naphthyl group in the 6-position. This compound when considered with the other compounds explicitly disclosed by the reference would render several of the claimed compounds obvious to one of ordinary skill in the art as explained above. While the reference does not discuss using Suzuki coupling, this reaction is well known in the art and within the skill of an ordinary artisan. One of ordinary skill in the art presented with the halide bearing compounds above (such as compounds A-19, A-26, A-27, A-43, and A-72; [0026], [0028], [0031], and [0037]), and compounds such as A-32 and A-81 ([0029] and [0039]) having two linked aryl groups (biphenyl), which demonstrates further functionalization beyond a single aryl group, would readily envision aryl substituted imidazo[1,2-a]pyridine compounds which overlap with the presently claimed compound (as explained above).

Additionally applicants cite examples 18-21 and comparative example 3 as demonstrating unexpected results. However, the evidence is not commensurate with the scope of the present claims. It is well settled that evidence presented to rebut a

prima facie case of obviousness must be commensurate in scope with the claims to which it pertains and that such evidence which is considerably narrower in scope than the claimed subject matter is not sufficient to rebut a prima facie case of obviousness. *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ805, 808 (CCPA 1979). Also see *In re Boesch*, 617 F.2d at 276, 205 USPQ at 219; *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972) and *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). As the rejected claims are significantly broader in terms of suitable Ar<sup>1</sup>, Ar<sup>2</sup>, L<sup>1</sup> and L<sup>2</sup> than examples 18-21 and comparative example 3 of the specification, which applicant cites as evidence of unexpected results and which are limited to a comparison of compounds where Ar<sup>1</sup> is phenyl or naphthyl, Ar<sup>2</sup> is 9-naphthyl-anthracene, L<sup>1</sup> is a single bond, and L<sup>2</sup> is phenylene, the evidentiary showing is far from being commensurate in scope with the degree of patent protection sought. *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1058 (fed. Cir. 1990) ("[O]bjective evidence of nonobviousness must be commensurate in scope with the claims." (quoting *In re Lindner*, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); *In re Dill*, 604 F.2d 1356, 1361, 202 USPQ 805, 808 (CCPA 1979) ("The evidence presented to rebut a prima facie case of obviousness must be commensurate in scope with the claims to which it pertains.")).

#### ***Allowable Subject Matter***

12. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: While the closest prior art, Kim et al. (US 6,998,487 B2), teaches compounds wherein Ar<sup>2</sup> is an aryl group with 6-60 carbons as described above, the reference does not teach or suggest the specific groups for Ar<sup>2</sup> as claimed in claim 7.

### ***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on (571) 272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MHW

/Callie E. Shosho/  
Supervisory Patent Examiner, Art Unit 1794